

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 February 2004 (19.02.2004)

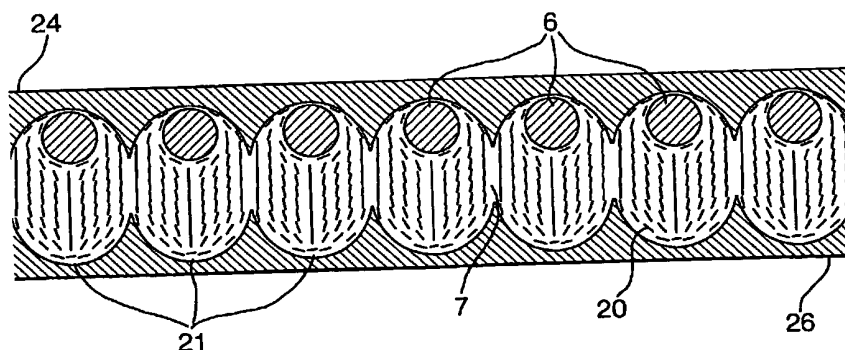
PCT

(10) International Publication Number
WO 2004/015491 A1

- (51) International Patent Classification⁷: **G02F 1/167**, 1/1334, 1/1337
- (21) International Application Number: **PCT/GB2003/003512**
- (22) International Filing Date: 11 August 2003 (11.08.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 0218776.3 13 August 2002 (13.08.2002) GB
- (71) Applicant (for all designated States except US): **QINETIQ LIMITED** [GB/GB]; Registered Office, 85 Buckingham Gate, London SW1 6PD (GB).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **MILLER, Richard, Jonathan** [GB/GB]; Qinetiq Limited, Malvern Technology Centre, St. Andrews Road, Malvern, Worcestershire WR14 3PS (GB). **HUI, Victor, Chaklam** [GB/GB]; Qinetiq Limited, Malvern Technology Centre, St. Andrews Road, Malvern, Worcestershire WR14 3PS (GB).
- (74) Agent: **DAVIES, P.**; IP QinetiQ Formalities, Cody Technology Park, A4 Building, Room G016, Ively Road, Farnborough, Hampshire GU14 0LX (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Declaration under Rule 4.17:**
— of inventorship (Rule 4.17(iv)) for US only
- Published:**
— with international search report

[Continued on next page]

(54) Title: PHORETIC DISPLAY DEVICE WITH LIQUID CRYSTALLINE SUSPENSION MEDIUM, AND MANUFACTURING METHOD



(57) Abstract: A phoretic display device comprising a plurality of electrophoretic or magnetophoretic cells, each having a phoretic particle (6) dispersed within a suspension medium (7) comprising a liquid crystal material (20). The phoretic cell is adapted to induce defects (21), sometimes known as disclinations, in the alignment of the liquid crystal material (20) within the cell which act to exert a retentive force on the phoretic particle (6) when within the region of influence of the defects (21). The configuration of the display introduces a threshold level in the electric or magnetic field required to move the phoretic particle (6) between defects (21) within the cell. Accordingly, the non-linear electro-optic or magneto-optic behavior of the display facilitates matrix addressing of the cells therein. The display may comprise a plurality of prolate spheroid phoretic cells arranged in an encapsulant the major (long) axis of each cell arranged substantially perpendicular to the plane of the display.